Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

II. Solution by G. B. M. ZERR, A. M., Principal of High School, Staunton, Virginia.

In solving this problem many things should be considered. We should know the temperature, the barometric pressure and the dew point in order to calculate the amount of aqueous vapor present in the air.

Not knowing the above it will be well to proceed as follows:

Let r=outside radius of bubble, x=inside radius.

ρ=density of air, ρ_1=density of hydrogen, ρ_2=density of soap film, all at the given temperature and pressure and all referred to normal air as standard.

$$\text{Then } \tfrac{4}{3}\pi(r^3-x^3)=\text{volume of soap film},$$

$$\tfrac{4}{3}\pi\times\frac{x^3}{16}=\text{volume of hydrogen},$$

$$\tfrac{4}{3}\pi\times\frac{15x^3}{16}=\text{volume of air}.$$

$$\therefore\quad \tfrac{4}{3}\pi(r^3-x^3)\rho_2+-\tfrac{4}{3}\pi\times\frac{x^3}{16}\rho_1+\tfrac{4}{3}\pi\times\frac{15x^3}{16}\rho=\tfrac{4}{3}\pi r^3\rho,$$

$$\therefore\quad 16r^3\rho_2-16x^3\rho_2+x^3\rho_1+15c^3\rho=16r^3\rho,$$

$$\therefore\quad x^3=\frac{16r^3(\rho_2-\rho)}{16\rho_2-15\rho-\rho_1},\quad\therefore\quad x=2r\sqrt[3]{\left(\frac{2(\rho_2-\rho)}{16\rho_2-15\rho-\rho_1}\right)}.$$

$$r-x=r-2r\sqrt[3]{\left(\frac{2(\rho_2-\rho)}{16\rho_2-15\rho-\rho_1}\right)}=\text{required thickness.}$$

Let the conditions be normal and suppose ρ_2, referred to water, is 1.1. Then since air, referred to water, is .001293, ρ_2, referred to air, is 850 73473, $\rho=1$, $\rho_1=.0693$, $r=1$.

Then $r-x=1-2\sqrt[3]{(\frac{1199.46946}{13596.68638})}=.000023$.

Also solved by *P S. Berg*, *F. P. Matz*, and the *Proposer*.

14. Proposed by COOPER D. SCHMITT, A. M., Professor of Mathematics, University of Tennessee, Knoxville, Tennessee.

I have a glass paper-weight in the form of a regular icosahedron. I let the sun's rays fall upon it, at various angles, also upon one of the vertices. How many complete spectra will be formed? How many will be of white light? What position will give maximum number of spectra?

[No solution to this problem has as yet been furnished by our contributors, and I see no way of solving it. If a solution is possible it will be a very pretty one. —EDITOR.]

PROBLEMS.

22. Proposed by F. P. MATZ, M. Sc., Ph. D., Professor of Mathematics and Astronomy in New Windsor College, New Windsor, Maryland.

From what kind of dry wood must a ship's log be cut, in order that the log may float with its center of gravity at the water's surface?